

The Monthly Bulletin of the Missouri Weather Service for July says that in the center and northern portions of the State the month was characterized by unusually high temperatures, a high percentage of sunshine, and drought conditions, that in some localities were the severest that have been experienced for many years, and proved most disastrous to agricultural interests. The hot winds that prevailed on the 24th, 25th, and 26th caused the standing corn to fire badly, and many fields were utterly ruined except for fodder.

The July report of the Ohio Weather and Crop Service notes five days of general and heavy rains and seventeen days of light local rains; the greatest local monthly precipitation was 5.16 and the least 0.05. Notwithstanding this rain the report states the average precipitation was deficient, and that at the close of the month the crops were rapidly drying up.

The July Bulletin of the Oklahoma Weather Service states that in Oklahoma City rain fell on four days only, and the total amount was about one-third of the normal. At the close of the month rain was badly needed.

The Monthly Weather Review of the Pennsylvania State Weather Service says: "The extremely warm and dry weather, with high percentage of sunshine, continuing throughout the entire month, produced a general drought."

The Monthly Bulletin of the Kentucky Weather Service for the month of July says: "There was a deficiency of precipitation in nearly all sections of the State. A very serious drought set in and continued through the month."

The Monthly Meteorological Summary of the South Dakota Weather Service for July says: "The month was excessively warm, with hardly any precipitation. All the crops suffered severely from the drought and high winds."

## WIND.

### PREVAILING WINDS.

The prevailing winds for July, 1894, viz, those that were recorded most frequently at Weather Bureau stations, are shown in Tables I and VIII; they are not given on Chart II, as has hitherto been the custom, but the resultant winds are published instead.

### RESULTANT WINDS.

The resultant winds for the current month, as deduced from the hourly records by self-registers at about 67 regular Weather Bureau stations, are given in Table VIII. Other resultants, deduced from the personal observations made at 8 a. m. and 8 p. m., are given in Table IX. These latter resultants are also shown graphically on Chart II, in connection with the isobars based on the same system of simultaneous observation; the small figure attached to each arrow shows the number of hours that this resultant prevailed, on the assumption that each of the morning and evening observations represents one hour's duration of a wind of average velocity; these figures (or the ratio between them and the total number of observations in this month) indicate the extent to which winds from different directions counterbalanced each other. The original north, south, east, and west components are given in detail in Table IX.

During July the resultant movement was generally from the southwest in New England, the middle and south Atlantic States, the Florida Peninsula, Ohio Valley and Tennessee, lower Lake region, North Dakota, upper Mississippi and Missouri valleys.

### HIGH WINDS.

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows (maximum velocities are averages for five minutes; extreme velocities are gusts of shorter duration):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles.				Miles.	
Amarillo, Tex. ....	30	54	n.	Little Rock, Ark. ....	1	51	ne.
Chicago, Ill. ....	12	50	sw.	Pikes Peak, Colo. ....	27	72	w.
Huron, S. Dak. ....	11	60	sw.				

### LOCAL STORMS.

Destructive or severe local storms were reported as follows:  
**1st.**—Waynesboro, Va., 2 persons killed and 1 injured by lightning. Adairsville, Ga., horse killed by lightning. Greenville, Miss., 1 person killed by lightning. Glen Allan, Miss.,

1 person killed by lightning. Memphis, Tenn., 1 person killed by lightning. Golconda, Ill., hailstorm. Olney, Ill., and Delphi, Ind., thunderstorms. Greenville, Mo., hailstorm.

**2d.**—Fall River and Siasconset, Mass., thunderstorms. Near Hess Road Station, N. Y., horse killed by lightning. New Cumberland, W. Va., thunderstorm. Pensacola, Fla., horse killed by lightning. Nashville, Tenn., windstorm. Golconda, Ill., hailstorm.

**3d.**—Lynchburg, Va., thunderstorm. Radersburg, Mont., hailstorm. Salt Lake City, Utah, thunderstorm.

**4th.**—Kansas City and Palestine, Mo., thunderstorms. Near Houston, Mo., 2 horses killed by lightning. Table Rock, Colo., thunderstorm.

**5th.**—Marysville, Mont., 4 horses killed by lightning. Spokane, Wash., thunderstorm.

**6th.**—Elmira, N. Y., hailstorm. Stephens City, Va., stock killed by lightning. Lovilia, Iowa, thunderstorm.

**7th.**—Independence, Kans., hailstorm. Southeast of Miles City, Mont., man and horse killed by lightning. Sixteen miles southwest of Spokane, Wash., man killed by lightning.

**8th.**—North Platte, Nebr., horse killed by lightning.

**9th.**—Hawkinsville, Ga., thunderstorm. Gardnerville, Nev., several persons stunned and a horse killed by lightning.

**10th.**—Detroit, Mich., thunderstorm.

**11th.**—Huron, S. Dak., windstorm.

**13th.**—Tampa, Fla., and Binola, Ohio, thunderstorms. Near Bellefontaine, Ohio, a boy and horse killed by lightning.

**14th.**—New York, N. Y., 1 person killed. Middletown and Wappingers Falls, N. Y., thunderstorms. Eldorado, Kans., stock killed by lightning.

**15th.**—Hillsboro, N. Y., thunderstorm. Winnview, Okla., 3 persons injured by lightning. Levan, Utah, man killed by lightning.

**16th.**—At Algiers, La., 2 persons killed and 19 stunned by lightning. Lehigh, Ind. T., 1 person fatally injured by lightning.

**18th.**—Point Peter, Ga., rainstorm. Little Rock, Ark., thunderstorm.

**19th.**—Louisville, Ky., and Gainesville, Tex., thunderstorms. Burr Oak, Mich., 3 persons stunned by lightning.

**20th.**—Niagara County, N. Y., windstorms. Tiffin, Ohio, thunderstorm. Rawsonville, N. Y., thunderstorm.

**21st.**—Boston, Mass., thunderstorm. Dover, Del., 2 persons injured and a horse killed by lightning. Norfolk, Va., 2 persons killed by lightning.

**24th.**—Near Detroit, Mich., thunderstorm. Port Huron, Mich., horse killed.

**25th.**—South Bend, Ind., thunderstorm.  
**26th.**—Donaldsonville, La., stock killed by lightning. Lexington, Ky., thunderstorm. Concordia, Kans., windstorm.  
**27th.**—Corning, Ark., hailstorm. Collegeville, Minn., windstorm.  
**28th.**—Brookfield and Honeymead Brook, N. Y., thunderstorms. Near St. Charles, Mo., hailstorm. Carthage, Mo., thunderstorm. Belle Rose, La., 2 horses killed by lightning.  
**29th.**—Cornwall, Vt., 2 horses killed by lightning. Manchester, N. H., thunderstorm. New Haven, Conn., 2 persons injured by lightning. Near Newton, N. J., windstorm. Stanardsville, Va., hailstorm. Atlanta, Ga., and

Nashville, Tenn., thunderstorms. Springdale, Tenn., and Ellsworth, Ohio., windstorms. Grovedale, Mo., hailstorm. Near Heber City, Utah, thunderstorm.

**30th.**—Middletown, N. Y., 4 persons stunned by lightning. Scotchtown, N. Y., 2 cows killed by lightning. Howells, N. Y., and Granite Falls, Minn., thunderstorms. Luverne, Minn., stock killed by lightning. Morris, Minn., hailstorm.

**31st.**—Glastonbury and Weathersfield, Conn., hailstorms. Fleming, N. J., thunderstorm. Pensacola, Fla., one person stunned by lightning. Brooksville, Fla., and Nashville, Tenn., thunderstorms. Litchfield, Ill., windstorm. Steffen-ville, Mo., stock killed by lightning.

## INLAND NAVIGATION.

## STAGE OF WATER IN RIVERS.

The following table shows the danger point and the highest and lowest stages for the month of July, 1894:

*Heights of rivers above low-water mark, July, 1894.*

Stations.	Danger-point gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Shreveport, La. ....	29.2	5.5		—1.8	31	7.3
<i>Arkansas River.</i>						
Fort Smith, Ark. ....	22.0	10.7	1	1.2	29, 31	9.5
Little Rock, Ark. ....	23.0	11.4	5	3.9	30, 31	7.5
<i>Missouri River.</i>						
Fort Buford, N. Dak. ....	25.0					
Bismarck, N. Dak. ....	75.0					
Pierre, S. Dak. ....	13.0					
Sioux City, Iowa ....	18.7	14.2	1	11.2	30, 31	3.0
Omaha, Nebr. ....	18.0	14.0	1	11.0	31	3.0
Kansas City, Mo. ....	21.0	19.6	3	13.4	31	6.2
<i>Mississippi River.</i>						
St. Paul, Minn. ....	14.0	2.8	1, 2	0.2	30	2.6
La Crosse, Wis. ....	10.0	4.2	1	1.3	31	2.9
Dubuque, Iowa ....	16.0	4.7	1, 2	1.2	31	3.5
Davenport, Iowa ....	15.0	3.3	1	0.6	31	2.7
Keokuk, Iowa ....	14.0	3.5	1	0.3	31	3.2
Hannibal, Mo. ....	17.0	4.1	1	1.1	29, 31	3.0
St. Louis, Mo. ....	30.0	17.0	1	8.8	31	8.2
Cairo, Ill. ....	40.0	18.3	1	9.7	30	8.6
Memphis, Tenn. ....	33.0	12.2	3, 4	4.9	31	7.3
Vicksburg, Miss. ....	41.0	17.0	1, 10	7.4	31	9.6
New Orleans, La. ....	13.0	5.7	1	3.9	25	1.8
<i>Ohio River.</i>						
Parkersburg, W. Va. ....	38.0	4.0	2, 3	0.6	22, 29	3.4
Cincinnati, Ohio ....	45.0	8.0	2, 3	4.1	27, 28	3.9
Louisville, Ky. ....	24.0	4.7	3, 5	2.7	20-31	2.0
<i>Cumberland River.</i>						
Nashville, Tenn. ....	40.0	6.2	3	2.0	20	4.2

## Heights of rivers—Continued.

Stations.	Danger-point gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Tennessee River.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Chattanooga, Tenn. ....	33.0	4.4	1, 4	1.8	17	2.6
Knoxville, Tenn. ....	29.0					
<i>Monongahela River.</i>						
Pittsburg, Pa. ....	22.0	6.0	27, 29	4.5	7	1.5
<i>Savannah River.</i>						
Augusta, Ga. ....	32.6	16.6	31	4.9	16	11.7
<i>Willamette River.</i>						
Portland, Oregon ....	15.0	23.0	1	12.4	31	10.6
<i>Susquehanna River.</i>						
Harrisburg, Pa. ....	17.0					
<i>Alabama River.</i>						
Montgomery, Ala. ....	48.0	2.7	25	0.8	3-5, 18, 19	1.9
<i>James River.</i>						
Lynchburg, Va. ....	18.0	1.0	1	0.7	8-22, 26-31	1.0
<i>Sacramento River.</i>						
Red Bluff, Cal. ....	22.0	1.8	1, 2	1.0	28-31	0.8
Sacramento, Cal. ....	25.0	15.6	1	9.6	31	6.0
<i>Des Moines River.</i>						
Des Moines, Iowa ....	19.0	3.8	1, 2	3.1	30	0.7

## FLOODS.

The above table shows that the flood in the Fraser and Willamette rivers, which had risen above the danger line at Portland, Oreg., during June, has subsided, but that they were, on the 31st, only a little below the danger line. No other floods have been reported. In many cases the rivers are unusually low, and river navigation was generally suspended in the upper Ohio and Mississippi.

## ATMOSPHERIC ELECTRICITY.

## GENERAL STATISTICS.

The table on page 290 shows in detail for July, 1894, the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month.

## THUNDERSTORMS.

A mention of the more severe thunderstorms reported during the month is given under "Local storms." The dates on which reports of thunderstorms were most numerous were the 1st, 6th, 13th to 21st, 29th to 31st.

The States where thunderstorm reports were most numerous were: Colorado, Florida, Massachusetts, North Carolina, Ohio, Pennsylvania, and South Carolina.

The States where the dates of thunderstorms were most frequent were: Colorado and Florida, where they were recorded every day in the month, and Louisiana, South Carolina, and Texas, where they occurred on twenty-eight days.

## AURORAS.

The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four days preceding and following the date of full moon, viz, from the 13th to the 21st, inclusive. On the remaining twenty-two days of the month 191 reports were received, or an average of 9 per day. The dates on which the reported number especially exceeded this average were the 1st, 74; 7th, 33; 28th, 20.

The States from which auroras were reported by a large percentage of observers were: Delaware, Iowa, Maine, Massachusetts, Minnesota, Montana, New Hampshire, North Dakota, Vermont, and Wisconsin.

## DAMAGE BY LIGHTNING.

The following statistics of the damage done by lightning in July, so far as reported by the observers of this Bureau, are furnished by Mr. Alexander McAdie: